Low numbers of individuals were recorded preceding the irruption (January/April 1975) and after the irruption (January/March 1976). This indicates clearly the decline in numbers because after I had solicited reports there would have been increased interest by observers. Some of the differences in Figure 1 may be attributable to variation in observer effort; for example, there were more observers in the South-west than in the wheatbelt and goldfields.

The number of White-necked Herons in southwestern Australia in winter and spring 1975 was considerably more than encountered in preceding or subsequent years. Also notable was the high number of individuals per sighting, with up to 26 flying together; usually in southwestern Australia this heron is recorded singly or rarely more than two together. The tapering off of sightings in the summer of 1975-76 followed good falls of rain in northern, and below average rain in southern Western Australia (Anon. 1975j-l). Therefore birds retreating from southern areas would have encountered favourable conditions in the north.

The unusual population increase of White-necked Heron in southwestern Australia in 1975 was mirrored by Black-tailed Native Hen (*Gallinula ventralis*) which was also present in larger numbers in winter and spring. Large aggregations were reported from Leonora and Giles in June and July. By July I noted flocks throughout the northern wheatbelt as far south as Wongan Hills.

In summary, the irruption of large numbers of White-necked Heron in southern Western Australia in 1975 was preceded by favourable breeding seasons in eastern and perhaps northern Australia in 1973 and 1974. Below average rains in eastern Australia in 1975 reduced suitable mesic environments there and led to a dispersal elsewhere. The availability of favourable mesic environments in southern Western Australia enabled many individuals to move into the South-west.

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PINCUSHION MILLIPEDES (DIPLOPODA: POLYXENIDA): THEIR AGGREGATIONS AND IDENTITY IN WESTERN AUSTRALIA

By L.E. KOCH, Western Australian Museum, Perth, W.A. 6000.

In some areas of Western Australia, tiny brown polyxenid millipedes appear periodically in slow-moving aggregations comprising vast numbers of individuals. In the north-west of W.A. major outbreaks have been reported to me since 1972 from the Hamersley Range area. The towns whose inhabitants have been particularly troubled by these teeming millipede masses have included Wittenoom and Tom Price. The millipedes, which reach a length of about 3mm, have gained their common name of pincushion millipedes from

the tufts of hydrofuge (water-repelling) hair-like spines along the sides of their bodies (Figure 1). Large numbers of specimens of these pincushion millipedes have been lodged in the Western Australian Museum and I identify them as *Unixenus mjobergi* (Verhoeff, 1924); this constitutes the first scientifically published record of this species from the area.

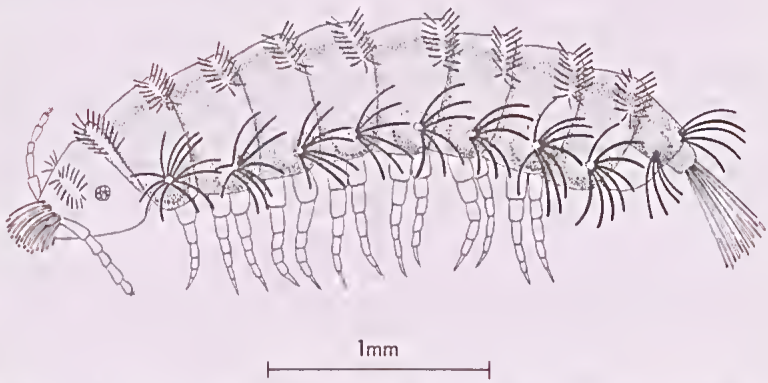

Figure 1. A Pincushion Millipede (*Unixenus mjobergi*) from Hamersley Range, W.A. (Drawing by Deborah Feher).

The first specimens of this species had been collected under decaying *Pandanus* leaves in the Kimberley region of W.A. in 1911. This species was originally placed in the genus *Monographis* by Verhoeff (1924) but was later transferred to the genus *Unixenus* Jones by Duy-Jacquemin & Conde (1967). The genus *Unixenus* has six or seven species and occurs in India, southeast Asia, Australia, Madagascar, and West Africa (Hoffman, 1979).

In the south-west of W.A., two batches of apparently misnamed pincushion millipedes have been recorded: from Bridgetown (Richters, 1908) and Torbay, near Albany (Attems, 1911). The Bridgetown specimens were identified as *Polyxenus lagurus* L., a species widespread in Europe but a genus absent in Australia. These Bridgetown specimens were presumably lodged in the Hamburg Museum but have not been studied by Duy-Jacquemin, Conde, or myself. The Torbay specimens were identified as *Monographis schultzei* Attems, 1909, but Duy-Jacquemin & Conde (1967) assign this specific name to *Chilenexus*, a genus they confine to South Africa, and they describe the Torbay specimens as *Unixenus attemsi*. I have not come across records of polyxenids in other parts of Australia.

Pincushion millipedes are a strange divergent group belonging to an order of their own, the Polyxenida (but are sometimes classified in the Pselaphognatha or Penicillata). The order has been divided into from one to four families. The Australian species belong to the family Polyxenidae.

There are 90 or more species of this cosmopolitan order (Hoffman, 1979). They are thought to have similar habits and life histories, but much remains to be learnt about their reproductive biology (Lawrence, 1981). The species in Europe and North America are better known than those in South Africa.

The common European species *Polyxenus lagurus* in some districts has an unusual method of reproduction where there are no males but only females reproducing parthogenetically (Enghoff, 1978). These females have black dorsal stripes which are lacking when males are present. It is unknown to what extent parthogenesis occurs in the Australian species. Polyxenids produce about 10-20 eggs at a time and these are grouped together in a nest of interwoven hairs from the female.

Lawrence (1981) has published a general account in a somewhat inaccessible publication. A pincushion millipede hatches with 3 pairs of legs (as do other millipedes) and adds more pairs of legs at each of about 6 successive moults until reaching the adult stage with 13 pairs of legs. The adults have about 5 further moults without adding more legs, and the life span is 2 years, or a little longer. At the tip of each leg is an adhesive pad between 2 claws; these enable the creature to climb up walls and walk upside-down on ceilings. Overseas

pincushion millipedes have been reported as feeding on algae and occurring mainly in crevices in rocks, and under stones, leaf-litter and the bark of trees.

The Hamersley Range species has been observed in considerable numbers under rock flakes in spinifex (*Triodia*) dominated areas. Its activity has been noted as usually commencing after sunset and continuing for a few hours. Plagues have been encountered at Wittenoom in April and May 1973, February 1976, May 1977, and October 1983. At Tom Price 'countless millions' were present in February 1978, November 1982 to January 1983, and July 1983. These millipedes have invaded many buildings including living quarters. They appeared to be activated by rainfall, and their moving ranks travelled over their numerous dead on soil which was superficially flooded and even over ground that had been treated with insecticides. In spite of their intermittent appearance in plague proportions, very little is known of their life cycle and natural history. I would appreciate receiving any findings about the pincushion millipedes of the Hamersley Range and specimens (preserved in alcohol or methylated spirits) from other areas.

ACKNOWLEDGEMENTS

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BIRD POPULATIONS OF FARM PLANTATIONS IN THE HOTHAM RIVER VALLEY, W.A.

By E.F. BIDDISCOMBE, CSIRO, Private Bag, P.O., Wembley, W.A. 6014.

INTRODUCTION

About 50% of the Hotham River catchment was cleared by 1973, leading to significant saltland development (Peck and Hurle, 1973). Farm plantations were established in early winter 1976 at three locations in the catchment. Twenty-five species of trees and shrubs were evaluated over six or seven years for survival and growth near salt seeps (Biddiscombe *et al.*, 1985). It was assumed that successful afforestation would control salt seepage. The main objective of this paper is to describe the increase in bird species and numbers with the growth of plantations. The results may indicate the value of the plantations to surviving local avifauna which depend largely on small areas of uncleared forest and woodland. There appears to be no published report on avifauna in young farm plantations in Western Australia.

METHODS

Sites

Two plantations were 120 m apart on a gentle, partly-cleared slope at Bannister and two were on cultivated slopes near salt scalds at Dryandra and Popanyinning (Fig. 1). The subcatchments had been cultivated for 10 years (Bannister) to 50 years prior to the planting. The locations spanned about 90 km and 800 to 440 mm annual rainfall (80 to 85% in the wet season of May to